PATENT

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte Chinping Q. Yang and Robert Weixiu Du

Appeal No. _____
Application No. 09/867,736

APPEAL BRIEF

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant: Chinping Q. Yang et al. Art Unit: 2615
Application No.: 09/867,736 Examiner: Corey P. Chau
Filed: May 30, 2001
For: AUDIO POST PROCESSING IN DVD, DTV AND OTHER AUDIO VISUAL PRODUCTS

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
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APPEAL BRIEF

I. REAL PARTY IN INTEREST

This application is jointly assigned to Sony Corporation, of Tokyo, Japan and to Sony Electronics Inc., of Park Ridge, New Jersey.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-29 are pending in the Application, stand rejected, and are now on appeal. Claims 13, 15 and 16 are original claims, claims 2-4, 9-11, 14, 19 and 23 have each been amended once, claims 5-8, 12, 17-18, 20-22, 24-29 have each been amended twice and claim 1 has been thrice amended.

IV. STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection mailed December 14, 2006.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' invention is generally directed to an ordered method and apparatus for selectively post processing an audio signal according to available equipment and listener preferences. The claimed sequences improve sound quality, by among other benefits, reducing the clipping, chopping and tinny audio distortions that plague prior art systems (Application, page 7, lines 15-21). A multichannel signal is first matrix mixed by an audio decoder of an amplifier arrangement. Namely, either downmixing or Prologic techniques are applied. The matrixing technique utilized depends on the number of input and output channels. (Application, page 8, lines 11-17).

The method and network of the present invention sequences audio post processing techniques to create an optimal listening environment. One such application begins with matrixing an audio signal. Namely, downmixing or Prologic algorithms are applied to achieve channel parity. Enhanced surround sound programming decodes a surround channel from the input signal. The resultant surround channel drives ambient noise-producing loudspeakers positioned towards the rear and the sides of the listener. (Application, page 8, lines 11-17).

Low frequency input channels are directed to bass compatible speakers, and ambient noise containing channels are transmitted to a speaker that creates a three dimensional effect. Front speakers receive the ambient noise signal if VES is appropriate, and rear speakers are used if DCS technology is selected. A center channel equalizer may be used as a final post processing step. Another sequence calls for a matrixed signal to undergo surround sound, and bass management techniques, and then headphone algorithms. (Application, page 8, line 19 to page 8, line 3).

Of note, any of the above steps may be omitted based upon listener preference and equipment configuration. In one embodiment, a player console receives listener input and directs a plurality of decoders to perform a selected and/or appropriate post-processing technique. Such input relates to a post-processing effect preferred by the listener, as well as to the configuration of the playback system. (Application, page 9, lines 4-9).

Specific support for the claimed subject matter for the independent claims as a whole has been provided above. However, a direct mapping of the aforementioned discussion to the individual independent claims is presented below:

Independent Claim 1

An audio post processing method (Application, page 13, line 14, Fig. 4) comprising the following sequenced processes:

matrix mixing an audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), then

decoding a surround channel of the matrix mixed audio signal (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), then

outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46),

transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system to create a three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52), then

center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60).

Independent Claim 10

An audio post processing method (Application, page 13, line 14, Fig. 4) comprising the following ordered processes:

matrix mixing an audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), then

decoding a surround channel of the matrix mixed audio signal (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), then

outputting low frequency input channels to a bass compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), then applying a headphone algorithm to the matrix mixed audio signal (Application, page 20, lines 17-18, Fig. 4, block 62).

Independent Claim 17

An audio post processing system (Application, page 13, line 14, Fig. 4), comprising:

at least one decoder operable to perform the following sequenced steps (Application, page 13, line 19):

matrix mixing an audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), then

decoding a surround channel of the matrix mixed audio signal (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), then

outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46),

transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52), then

center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60);

a player console operable to receive a listener input (Application, page 18, lines 16-17, Fig. 4, block 46);

a signal source producing the matrix mixed audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of positions (Application, page 19, lines 17-20, Fig. 4, block 58).

Independent Claim 28

An audio post processing system (Application, page 13, line 14, Fig. 4), comprising:

at least one decoder operable to perform the following sequenced processes (Application, page 14, lines 13):

matrix mixing an audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), then

decoding a surround channel of the matrix mixed audio signal (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), then

outputting low frequency input channels to a bass compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), then

applying a headphone algorithm (Application, page 20, lines 17-18, Fig. 4, block 62);

a player console operable to receive a listener input (Application, page 18, lines 16-17, Fig. 4, block 46); and

a signal source producing the audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of destinations (Application, page 19, lines 17-20, Fig. 4, block 58).

Independent Claim 29

An audio post processing method (Application, page 13, line 14, Fig. 4) comprising performing a sequence selected from the group consisting of:

a) matrix mixing an audio signal and decoding a surround channel of the matrix mixed audio signal (Application, page 13, lines 16-17, Fig. 4, block 30; and page 17, lines 7-14, Fig. 4, blocks 36-40);

b) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), and outputting a low frequency input channel of the matrix mixed audio signal to a

low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46);

c) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30) and outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46);

d) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), and transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52);

e) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), and transmitting the ambient noise containing channel of the signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52);

f) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52);

g) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30) and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52);

h) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52), and center channel equalizing the input signal (Application, page 20, lines 3-4, Fig. 4, block 60);

i) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60);

j) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60);

k) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60);

l) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), decoding the surround channel of the matrix mixed audio signal (Application, page 17, lines 7-14, Fig. 4, blocks 36-40), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60);

m) matrix mixing the audio signal (Application, page 13, lines 16-17, Fig. 4, block 30), outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker (Application, page 18, lines 6-15, Fig. 4, block 46), transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect (Application, page 19, lines 3-10, Fig. 4, block 52), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60); and

n) matrix mixing and center channel equalizing the matrix mixed audio signal (Application, page 13, lines 16-17, Fig. 4, block 30 and page 20, lines 3-4, Fig. 4, block 60);

wherein matrix mixing always precedes decoding the surround channel (Application, page 13, lines 16-17, Fig. 4, block 30), outputting the low frequency input channel, transmitting the ambient noise containing channel (Application, page 18, lines 6-15, Fig. 4, block 46), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60),

wherein decoding the surround channel of the audio signal always precedes outputting the low frequency input channel (Application, page 18, lines 6-15, Fig. 4, block 46), transmitting the ambient noise containing channel (Application, page 19, lines 3-10, Fig. 4, block 52), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60),

wherein outputting the low frequency input channel always precedes transmitting the ambient noise containing channel (Application, page 19, lines 3-10, Fig. 4, block 52), and center channel equalizing the matrix mixed audio signal (Application, page 20, lines 3-4, Fig. 4, block 60), and

wherein transmitting the ambient noise containing channel always precedes center channel equalizing the matrix mixed audio signal (Application, page 19, lines 3-10, Fig. 4, block 52).

Other support for the claimed subject matter may generally be found in Fig. 4 and the accompanying text at page 13, line 14 to page 21, line 14 of the Application as filed. In addition, it should be noted that, as none of the claims recite any means plus function or step plus function elements, no identification of such elements is required pursuant to 37 CFR § 41.37(c)(1)(v).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1-29 stand rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

B. Claims 1- 29 stand rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the enablement requirement.

C. Claims 10-12, 15 and 29 stand rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter.

VII. ARGUMENT

Claims 1-29 are pending in the Application and stand rejected under 35 U.S.C. §112, first paragraph. Specifically, the Examiner alleges that the recitation of "decoding a surround channel of the matrix mixed audio signal" in the independent claims fails to comply with the written description requirement by claiming subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the Application was filed, had possession of the claimed invention. Appellants respectfully request that the rejections of claims 1-29 under 35 U.S.C. §112 be reversed because persons skilled in the art would reasonably conclude, after reading the Application, that Appellants have possession of the audio post processing system and methods set forth in the claims.

"The written description requirement of 35 U.S.C. §112, first paragraph, is separate from the enablement requirement found in the same provision of 35 U.S.C. §112. . . . Satisfaction of the 'written description' requirement does not require in *haec verba* antecedence in the originally filed application." Staehelin v. Secher, 24 USPQ2d 1513, 1519 (BPAI 1992). "Adequate description under the first paragraph of 35 U.S.C. §112 does not require literal support for the claimed invention. . . . Rather, it is sufficient if the originally-filed disclosure would have conveyed to one having ordinary skill in the art that an appellant had possession of the concept of what is claimed." Ex parte Parks, 30 USPQ2d, 1234, 1236-37 (BPAI 1993). "To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention." See, e.g., Moba, B.V. v. Diamond Automation, Inc., 66 USPQ2d 1429, 1438 (Fed. Cir. 2003); Vas-Cath, Inc. v. Mahurkar, 19 USPQ2d at 1116 (Fed. Cir. 1991). "If applicant amends the claims and points out where and/or how the originally filed disclosure supports the amendment(s), . . . the examiner has the initial burden of presenting evidence or reasoning to explain why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims." In re Wertheim, 191 USPQ 90, 96 (CCPA 1976); MPEP §§2163(II)(A), 2163.04. "Appellants need not disclose what is conventional or well known to one of ordinary skill in the art." See, Hybritech, Inc v. Monoclonal Antibodies, Inc, 231 USPQ2d 81, 94 (Fed. Cir. 1986).

Appellants' remarks in rebuttal to the Examiner's rejections are presented below. In some cases, specific discussions of particular claims are not made in the interests of streamlining the appeal. The omission of a discussion with respect to any particular claim, however, should not be interpreted as an acquiescence as to the merits of the Examiner's rejection of the claim, particularly with respect to claims reciting features that are addressed in connection with the rejections applied to other claims pending in the appeal.

A. Claims 1-29 Comply with 35 U.S.C. § 112, Second Paragraph

Independent Claim 1

As with the other independent claims in the pending Application, claim 1 generally relates to recites a specific sequence of audio post processing techniques that includes decoding a surround channel of the matrix mixed audio signal. For instance, claim 1 recites the following sequenced processes: matrix mixing an audio signal, then decoding a surround channel of the matrix mixed audio signal, then outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker, transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system to create a three dimensional effect, then center channel equalizing the matrix mixed audio signal.

In rejecting claim 1, the Examiner asserts that "decoding a surround channel of the matrix mixed audio signal" in the independent claim fails to comply with the written description requirement by claiming subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the Application was filed, had possession of the claimed invention.

The Examiner more particularly suggests that "decoding" may not be the "best" term to use. Appellants point to the definition offered by Merriam-Websters' Dictionary that defines "decode" as "to recognize and interpret (an electronic signal)." This definition is consistent with the word's use in the Application and in the field of endeavor. Of note, further efforts were made during two previous interviews and Responses to resolve the Examiner's issues with regard to the word choice. As discussed during those communications, support and explanation of decoding a surround channel can additionally be found at numerous instances of the Application, as filed. For instance, at page 5, lines 16-22:

> Enhanced surround sound is a desirable post processing technique available in systems having ambient noise producing or surround loudspeakers. Such speakers are arranged behind and on either side of the listener. *When decoding surround material*, four channels (left/center/right/surround) are reproduced from the input

signal. The surround channels enable rear localization, true 360° pans, convincing flyovers and other effects. (Emphasis added).

Also at, page 8, lines 11-17:

> The method and network of the present invention sequences audio post processing techniques to create an optimal listening environment. One such application begins with matrixing an audio signal. Namely, downmixing or Prologic algorithms are applied to achieve channel parity. *Enhanced surround sound programming decodes a surround channel from the input signal.* The resultant surround channel drives ambient noise-producing loudspeakers positioned towards the rear and the sides of the listener. (Emphasis added).

Appellants further note that Fig. 4 shows the claimed sequence with respect to decoding a surround channel of a matrix mixed audio signal. More particularly, blocks 30-34 show matrix mixing an audio signal, followed by then decoding a surround channel of the matrix mixed audio signal at block 40 of Fig. 4. Fig. 4 shows at blocks 42-46 how a low frequency input channel of the matrix mixed audio signal is then output to a low frequency effect compatible speaker, and transmitted an ambient noise containing channel of the matrix mixed audio signal to a speaker system to create a three dimensional effect at block 52. Fig. 4 further shows center channel equalizing the matrix mixed audio signal at block 60. It is this sequence of post processing techniques that improves sound quality, by among other benefits, reducing the clipping, chopping and tinny audio distortions that plague prior art systems.

Thus, the claimed subject matter, i.e., pertaining to decoding a surround channel in the specified sequence, is described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the Application was filed, had possession of the claimed invention. Appellants consequently submit that the Examiner has failed to present a prima facie case in rejecting claim 1 under 35 U.S.C. §112, first paragraph. Specifically, the Examiner has failed to present, by a preponderance of evidence, why persons skilled in the art

would not recognize in the present application a description of the claimed invention. For at least the reasons set forth above, Appellants respectfully request that the rejection of claim 1, as well as of claims 2-19 that depend therefrom, be reversed.

Dependent Claims 2-9

Dependent claims 2-9 are not separately argued.

Independent Claim 10

Claim 10 recites an audio post processing method comprising the following ordered processes: matrix mixing an audio signal, then decoding a surround channel of the matrix mixed audio signal, then outputting low frequency input channels to a bass compatible speaker, then applying a headphone algorithm to the matrix mixed audio signal.

In rejecting claim 10, the Examiner asserts that "decoding a surround channel of the matrix mixed audio signal" in the independent claim fails to comply with the written description requirement by claiming subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the Application was filed, had possession of the claimed invention.

As discussed above in connection with claim 1, decoding a surround channel is described in the specification at several instances, including at page 5, lines 16-22; page 8, lines 11-17, and in Fig. 4. Appellants consequently submit that the Examiner has failed to present a prima facie case in rejecting claim 10 under 35 U.S.C. §112, first paragraph. Specifically, the Examiner has failed to present, by a preponderance of evidence, why persons skilled in the art would not recognize in the present application a description of the claimed invention. For at least the reasons set forth above, Appellants respectfully request that the rejection of claim 10, as well as of claims 11-16 that depend therefrom, be reversed.

Dependent Claims 10-16

Dependent claims 10-16 are not separately argued.

Independent Claim 17

Claim 17 recites an audio post processing system, comprising: at least one decoder operable to perform the following sequenced steps: matrix mixing an audio signal, then decoding a surround channel of the matrix mixed audio signal, then outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker, transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect, then center channel equalizing the matrix mixed audio signal; a player console operable to receive a listener input; a signal source producing the matrix mixed audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of positions.

In rejecting claim 17, the Examiner asserts that "decoding a surround channel of the matrix mixed audio signal" in the independent claim fails to comply with the written description requirement by claiming subject matter not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the Application was filed, had possession of the claimed invention.

As discussed above in connection with claim 1, decoding a surround channel is described in the specification at several instances, including at page 5, lines 16-22; page 8, lines 11-17, and in Fig. 4. Claim 17 therefore complies with the enablement requirement. Reversal of the Examiner's rejection, and allowance of claim 17, as well as of claims 18-27 that depend therefrom, are therefore respectfully requested.

Dependent Claims 18-27

Claims 18-27 are not argued separately.

Independent Claim 28

Claim 28 recites an audio post processing system, comprising: at least one decoder operable to perform the following sequenced processes: matrix mixing an audio signal, then decoding a surround channel of the matrix mixed audio signal, then outputting low frequency input channels to a bass compatible speaker, then applying a headphone algorithm; a player console operable to receive a listener input; and a signal source producing the audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of destinations.

As with the preceding independent claims, the Examiner rejects claim 28 for lack of support regarding "decoding a surround channel of the matrix mixed audio signal." However, as discussed above, decoding a surround channel is described in the specification at several instances, including at page 5, lines 16-22; page 8, lines 11-17, and in Fig. 4. Claim 28 therefore complies with the enablement requirement. Reversal of the Examiner's rejection, and allowance of claim 28 are therefore respectfully requested.

Independent Claim 29

Claim 29 recites an audio post processing method comprising performing a sequence selected from the group consisting of: a) matrix mixing an audio signal and decoding a surround channel of the matrix mixed audio signal; b) matrix mixing the audio signal, decoding the surround channel, and outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker; c) matrix mixing the audio signal and outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker; d) matrix mixing the audio signal, decoding the surround channel,

outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect; e) matrix mixing the audio signal, decoding the surround channel, and transmitting the ambient noise containing channel of the signal to the speaker system operable to create the three dimensional effect; f) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect; g) matrix mixing the audio signal and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect; h) matrix mixing the audio signal, decoding the surround channel, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the input signal; i) matrix mixing the audio signal, decoding the surround channel, and center channel equalizing the matrix mixed audio signal; j) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal; k) matrix mixing the audio signal, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal; l) matrix mixing the audio signal, decoding the surround channel of the matrix mixed audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal; m) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal; and n) matrix mixing and center channel equalizing the matrix mixed audio signal;

wherein matrix mixing always precedes decoding the surround channel, outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein decoding the surround channel of the audio signal always precedes outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein outputting the low frequency input channel always precedes transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, and wherein transmitting the ambient noise containing channel always precedes center channel equalizing the matrix mixed audio signal.

In rejecting claim 29, the Examiner asserts a lack of support regarding "decoding a surround channel of the matrix mixed audio signal." However, as discussed above, decoding a surround channel is described in the specification at several instances, including at page 5, lines 16-22; page 8, lines 11-17, and in Fig. 4. Claim 29 therefore complies with the enablement requirement. Reversal of the Examiner's rejection, and allowance of claim 29 are therefore respectfully requested.

B. Claims 1-29 Comply with the Enablement Requirement

Each of independent claims 1, 10, 17, 28 and 29 calls out a specific sequence of post processing techniques as described and shown in Fig. 4 of the Application as filed and as described herein. As such, the disclosure provided by Appellants is sufficient to enable one of skill in the art to perform the invention embodiments according to the best mode known at the time of filing.

Turning with particularity to claim 29, claim 29 recites an audio post processing method comprising performing a sequence selected from the group consisting of: a) matrix mixing an audio signal and decoding a surround channel of the matrix mixed audio signal; b) matrix mixing the audio signal, decoding the surround channel, and outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker; c) matrix mixing the audio signal and outputting the low frequency input channel of the matrix mixed audio signal to

the low frequency effect compatible speaker; d) matrix mixing the audio signal, decoding the surround channel, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect; e) matrix mixing the audio signal, decoding the surround channel, and transmitting the ambient noise containing channel of the signal to the speaker system operable to create the three dimensional effect; f) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect; g) matrix mixing the audio signal and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect; h) matrix mixing the audio signal, decoding the surround channel, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the input signal; I) matrix mixing the audio signal, decoding the surround channel, and center channel equalizing the matrix mixed audio signal; j) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal; k) matrix mixing the audio signal, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal; l) matrix mixing the audio signal, decoding the surround channel of the matrix mixed audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal; m) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the

matrix mixed audio signal; and n) matrix mixing and center channel equalizing the matrix mixed audio signal; wherein matrix mixing always precedes decoding the surround channel, outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein decoding the surround channel of the audio signal always precedes outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, wherein outputting the low frequency input channel always precedes transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, and wherein transmitting the ambient noise containing channel always precedes center channel equalizing the matrix mixed audio signal.

As such, claim 29 recites a number of different sequences/embodiments of post processing steps. In rejecting claim 29, the Examiner asserts the claim is not enabling because a claimed sequence does not include all of the additional/surrounding processes shown in Fig. 4. However, Appellants assert that the claimed sequences (each of which provide improved sound quality) are fully described in the disclosure, and that mere fact that additional sequences could be added to a specific Markush group does not make it non-enabling. As a consequence, Appellants respectfully request that the rejection of claim 29 based on 35 U.S.C. § 112, first paragraph, be reversed.

Furthermore, for the reasons presented above with regard to independent claims 1, 10, 17, 28 and 29, Appellants respectfully request that the rejection of claims 1-29 based on 35 U.S.C. § 112, first paragraph, also be reversed.

C. Claims 10-12, 15 and 29 are Directed to Statutory Subject Matter

In rejecting claims 10-12, 15 and 29, the Examiner asserts that the claimed features do not result in a useful and practical result. However, as discussed herein, the specifically claimed sequences of post processing techniques results in a physical transformation of an audio signal that produces a useful result in the form of, among other benefits, reduced clipping, chopping and tinny audio distortions that plague prior art systems.

Appellants consequently request that the 35 U.S.C. § 101 rejections of claims 10-12, 15 and 29 be reversed.

CONCLUSION

In conclusion, Appellants respectfully request that the Board reverse the Examiner's rejections of claims 1-29, and that the Application be passed to issue. If there are any questions regarding the foregoing, please contact the undersigned at 513/241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

WOOD, HERRON & EVANS, L.L.P.

Date: May 14 2007

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VIII. CLAIMS APPENDIX: CLAIMS ON APPEAL (S/N 09/867,736)

1. (Previously Presented) An audio post processing method comprising the following sequenced processes:

matrix mixing an audio signal, then

decoding a surround channel of the matrix mixed audio signal, then

outputting a low frequency input channel of the matrix_mixed audio signal to a low frequency effect compatible speaker,

transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system to create a three dimensional effect, then

center channel equalizing the matrix mixed audio signal.

2. (Previously Presented) The audio post processing method according to claim 1, wherein matrix mixing the audio signal further comprises applying a downmixing algorithm to the audio signal.

3. (Previously Presented) The audio post processing method according to claim 1, wherein matrix mixing the audio signal further comprises extracting at least four channels from the matrix mixed audio signal.

4. (Previously Presented) The audio post processing method according to claim 1, further comprising driving a centrally-located loudspeaker with a center channel of the matrix mixed audio signal.

5. (Previously Presented) The audio post processing method according to claim 1, further comprising driving a plurality of loudspeakers positioned towards the rear and to the sides of a listener with the surround channel of the matrix mixed audio signal.

6. (Previously Presented) The audio post processing method according to claim 1, further comprising using a bass channel of the matrix mixed audio signal to drive a low frequency effect loudspeaker.

7. (Previously Presented) The audio post processing method according to claim 1, further comprising transmitting ambient noise to a plurality of loudspeakers positioned towards the rear and the sides of a listener.

8. (Previously Presented) The audio post processing method according to claim 1, further comprising transmitting ambient noise to a loudspeaker positioned towards the front of a listener to create a encompassed impression.

9. (Previously Presented) The audio post processing method according to claim 1, further comprising inputting a listener preference and available equipment status into a player console, wherein the listener preference reflects a desired post processing effect.

10. (Previously Presented)) An audio post processing method comprising the following ordered processes:

matrix mixing an audio signal, then

decoding a surround channel of the matrix mixed audio signal, then

outputting low frequency input channels to a bass compatible speaker, then

applying a headphone algorithm to the matrix mixed audio signal.

11. (Previously Presented) The audio post processing method according to claim 10, wherein matrix mixing the audio signal further comprises-applying a downmixing algorithm to the audio signal.

12. (Previously Presented) The audio post processing method according to claim 10, wherein matrix mixing the audio signal further comprises-extracting at least four channels from the audio signal.

13. (Original) The audio post processing method according to claim 10, further comprising driving the headphone speaker with a center channel of the signal.

14. (Previously Presented) The audio post processing method according to claim 10, further comprising driving the headphone speaker with a surround channel of the matrix mixed audio signal.

15. (Original) The audio post processing method according to claim 10, further comprising transmitting ambient noise to the headphone speaker.

16. (Original) The audio post processing method according to claim 10, further comprising inputting a listener preference and available equipment status into a player console, wherein the listener preference reflects a desired post processing effect.

17. (Previously Presented) An audio post processing system, comprising:

at least one decoder operable to perform the following sequenced steps:

matrix mixing an audio signal, then

decoding a surround channel of the matrix mixed audio signal, then

outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker,

transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect, then

center channel equalizing the matrix mixed audio signal;

a player console operable to receive a listener input;

a signal source producing the matrix mixed audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of positions.

18. (Previously Presented) The audio post processing system of claim 17, further comprising output amplifiers operable to drive a loudspeaker positioned at one or more of the following positions relative to a listener: front, right, left and rear.

19. (Previously Presented) The audio post processing system of claim 17, further comprising output amplifiers operable to drive a headphone speaker.

20. (Previously Presented) The audio post processing system of claim 17, wherein the listener input reflects a listener preference and the disposition of available equipment.

21. (Previously Presented) The audio post processing system of claim 17, further comprising surround sound channel output amplifiers driving loudspeakers positioned towards the rear and sides of a listener.

22. (Previously Presented) The audio post processing system of claim 17, further comprising a center channel equalizer output amplifier driving a loudspeaker positioned towards the front and center of a listener.

23. (Previously Presented) The audio post processing system of claim 17, further comprising a bass channel amplifier driving a low frequency effect loudspeaker.

24. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder utilizes digital cinema sound techniques to direct ambient noise channels of the audio signal to loudspeakers positioned towards the rear of a listener.

25. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder utilizes a virtual enhanced sound algorithm to direct an ambient noise channel of the audio signal to loudspeakers positioned towards the front of a listener.

26. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder creates a center channel of the matrix mixed audio signal for driving a loudspeaker that is centrally located with respect to a listener.

27. (Previously Presented) The audio post processing system of claim 17, wherein the at least one decoder creates the surround sound channel for ambient noise and for driving two loudspeakers that are located to the right and left behind a listener.

28. (Previously Presented) An audio post processing system, comprising:

at least one decoder operable to perform the following sequenced processes:

matrix mixing an audio signal, then

decoding a surround channel of the matrix mixed audio signal, then

outputting low frequency input channels to a bass compatible speaker, then

applying a headphone algorithm;

a player console operable to receive a listener input; and

a signal source producing the audio signal comprised of a plurality of channels, each channel operable to drive a loudspeaker positioned at one or more of a plurality of destinations.

29. (Previously Presented) An audio post processing method comprising performing a sequence selected from the group consisting of:

a) matrix mixing an audio signal and decoding a surround channel of the matrix mixed audio signal;

b) matrix mixing the audio signal, decoding the surround channel, and outputting a low frequency input channel of the matrix mixed audio signal to a low frequency effect compatible speaker;

c) matrix mixing the audio signal and outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker;

d) matrix mixing the audio signal, decoding the surround channel, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting an ambient noise containing channel of the matrix mixed audio signal to a speaker system operable to create a three dimensional effect;

e) matrix mixing the audio signal, decoding the surround channel, and transmitting the ambient noise containing channel of the signal to the speaker system operable to create the three dimensional effect;

f) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect;

g) matrix mixing the audio signal and transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect;

h) matrix mixing the audio signal, decoding the surround channel, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the input signal;

i) matrix mixing the audio signal, decoding the surround channel, and center channel equalizing the matrix mixed audio signal;

j) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal;

k) matrix mixing the audio signal, transmitting the ambient noise containing channel of the matrix mixed audio signal to the speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal;

l) matrix mixing the audio signal, decoding the surround channel of the matrix mixed audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, and center channel equalizing the matrix mixed audio signal;

m) matrix mixing the audio signal, outputting the low frequency input channel of the matrix mixed audio signal to the low frequency effect compatible speaker, transmitting the ambient noise containing channel of the matrix mixed audio signal to the

speaker system operable to create the three dimensional effect, and center channel equalizing the matrix mixed audio signal; and

n) matrix mixing and center channel equalizing the matrix mixed audio signal;

wherein matrix mixing always precedes decoding the surround channel, outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal,

wherein decoding the surround channel of the audio signal always precedes outputting the low frequency input channel, transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal,

wherein outputting the low frequency input channel always precedes transmitting the ambient noise containing channel, and center channel equalizing the matrix mixed audio signal, and

wherein transmitting the ambient noise containing channel always precedes center channel equalizing the matrix mixed audio signal.

IX. EVIDENCE APPENDIX

09/867,736

None.

X. RELATED PROCEEDINGS APPENDIX

09/867,736

None.